REMARKS

Upon entry of this Amendment, which amends Claims 4 and 6-9, Claims 1-9 remain pending in the present application. In the November 19, 2003 Office Action, Claims 4-6 and 9 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 9 was objected to under 37 C.F.R. § 1.75 for double patenting (i.e. as being a substantial duplicate of Claim 6). Claims 6 and 9 were objected to for having minor informalities. Claims 1-4 were rejected under U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,633,616 to Crawford (hereinafter referred to as ""Crawford") in view of U.S. Patent No. 5,150,892 to Lee et al. (hereinafter referred to as "Lee et al."). Claim 8 was allowed. Claims 5, 6 and 9 were indicated as being allowable, on the conditions that they were rewritten to overcome the § 112 rejections and rewritten to include all of the limitations of the base claim and any intervening claims. Finally, Claim 7 was indicated as being allowable so long as it were rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant respectfully requests reconsideration of the claims in view of the above amendments and the comments below.

35 U.S.C. § 112, Second Paragraph, Claim Rejections – Claims 4-6 and 9

On page 2 of the November 19, 2003 Office Action, Claims 4-6 and 9 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. More specifically: Claim 4 was rejected for not providing proper antecedent basis for the term "said long

preamble"; Claim 5 was rejected for allegedly not providing definitions of the parameters recited in Claim 5; Claim 6 was rejected for not providing proper antecedent basis for the terms "said signal subspace" and "said non-signal subspace"; and Claim 9 was rejected for not providing proper antecedent basis for the terms "said signal subspace" and "said non-signal subspace".

In response, Applicant has amended Claims 4, 6 and 9 to correct the antecedent basis problems. In light of the corrections, Applicant requests that the § 112 rejections of Claims 4, 6 and 9 be withdrawn.

Regarding the rejection of Claim 5, Applicant disagrees that the that there is an indefiniteness problem. There is no requirement that claim terms be defined in the claim itself. The cost function recited and the meanings of its various parameters are set forth in the detailed description of the invention. (See, e.g. pages 7-9 of the specification). Applicant requests, therefore that the § 112 rejection of Claim 5 be withdrawn.

Double Patenting Rejection – Claim 9

On page 2 of the Office Action, Claim 9 was objected to under 37 C.F.R. § 1.75 as being a substantial duplicate of Claim 6. Claim 9 has been amended, so that it depends from independent Claim 8, which is the claim Applicant originally intended to claim dependency from. With this amendment, there is no longer an issue with double patenting. Applicant requests, therefore, that the double patenting rejection of Claim 9 be withdrawn.

Informality Rejections – Claims 6 and 9

On pages 3 of the Office Action, Claims 6 and 9 were objected to for ending in a comma. In response, Applicant has amended Claims 6 and 9 so that these informalities are removed. Applicant requests, therefore, that the objections to Claims 6 and 9 be withdrawn.

35 U.S.C. § 103 Claim Rejections – Claims 1-4

On pages 3 and 4 of the Office Action, Claims 1-4 were rejected under U.S.C. § 103 as being unpatentable over Crawford in view of Lee et al. For the following reasons, Applicant respectfully disagrees.

Crawford discloses a pilot tracking loop for an OFDM receiver, which includes a phase rotator, an FFT coupled to an output of the phase rotator, and a pilot phase error metric. The pilot phase error metric determines a phase error estimate associated with a received OFDM symbol. A loop filter is coupled to the pilot phase error metric output and an oscillator is coupled to the loop filter output. The oscillator output is coupled to the phase rotator to adjust the phase of subsequent OFDM symbols of the incoming signals.

Lee et al. discloses a digital frequency synthesizer that employs a frequency search method having two stages. One search stage is the coarse search stage, which is based on a "Prune-and-Search" algorithm, and the other search stage is the fine search

stage, which is base on a "fixed step" algorithm. To determine which search scheme is used to search a target frequency and to determine the lock status, two cost functions for search and lock-in are derived. These two cost functions define the search threshold and the lock threshold. If the frequency error is higher than both the search and lock thresholds , a coarse search is activated to estimate the correct frequency. Only when the frequency error falls between the search and the lock thresholds, the fine search is activated.

The presently claimed invention (e.g. independent Claim 1), by contrast, claims a method of determining a fine frequency-offset error (1) "assuming a coarse frequency offset after compensation by a previous circuit that will not exceed ±10 kHz", and (2) "using a cost function to determine a fine-frequency offset of said OFDM radio transmission for use in a subsequent circuit...." Applicant respectfully believes that neither of these two elements of independent Claim 1 are taught or suggested by the alleged prior art.

In paragraph 9, on page 32 of the Office Action, it is asserted that Col. 6, line 49 to Col. 7, line 5; Col. 15, line 53 to Col. 16, line 2; and Col. 29, lines 1-4 of Crawford "implies that tracking is effective when the offset (from the coarse stage) is less than ±10 kHz." Applicant respectfully disagrees. In particular, Col. 6, line 49 to Col. 7, line 5 merely describes portions of the 802.11a standard, e.g., "short symbol portion", "long signal portion", which are used for coarse and fine frequency offset estimation, respectively. Col. 15, line 53 to Col. 16, line 2 describe the characteristics of the LO

phase noise contribution versus frequency offset when no pilot tracking is performed and when pilot tracking, as taught by the Crawford disclosure, is performed. As shown in Figure 5 of Crawford, the pilot tracking technique proposed by Crawford helps to improve the phase noise. Col. 29, lines 1-4 of Crawford explains how the pilot tracking loops in Figure 2-16 of the patent are designed to reduce frequency pulling and pushing effects.

None of the three referenced sections of Crawford, whether taken alone or considered collectively, teach or "imply" that a coarse frequency offset after compensation by a previous circuit will not exceed an assumed value approximately ±10 kHz. Further, Applicant has found no such teaching or suggestion anywhere in the Crawford patent. Accordingly, for at least this first reason Applicant respectfully believes that the § 103 rejection of independent Claim 1, as allegedly being unpatentable over Crawford in view of Lee et al., cannot be properly maintained.

Crawford in view of Lee et al. also does not teach or suggest the third element of independent Claim 1, that is "using a cost function to determine a fine-frequency offset of said OFDM radio transmission for use in a subsequent circuit...." Whereas Lee et al. describe how cost functions are derived to determine which search scheme (i.e. which of "prune-and-search" or "fixed-step") is to be used, Lee et al. do not teach or suggest that the cost functions are used "to determine a fine-frequency offset of said OFDM for use in a subsequent circuit providing for frequency compensation of any fine-frequency offset," as independent Claim 1 recites. Accordingly, for at least this second reason Applicant

respectfully believes that the § 103 rejection of independent Claim 1, as allegedly being unpatentable over Crawford in view of Lee et al., cannot be properly maintained.

Claims 2-4 are all dependent from independent Claim 1. Accordingly, they are believed to be allowable over the alleged prior art for the same reasons Claim 1 is. Applicant requests, therefore, that the § 103 rejections of the dependent Claims 2-4 be withdrawn.

CONCLUSION

In view of the foregoing, Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 408-282-1857.

Respectfully submitted,

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